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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/824,443

04/15/2004

Gennadi Finkelshtain

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EXAMINER

SIDDIQUEE, MUHAMMAD S

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

07/09/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/824,443	Applicant(s) FINKELSHTAIN ET AL.	
	Examiner MUHAMMAD SIDDIQUEE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-53 and 118-135 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35-53 and 118-135 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/05/2008, 3/18/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's amendment filed on 3/18/2009 was received. Claims 1-34, 54-117 are cancelled and claims 35, 44 are amended and claims 118-135 are added.

Response to Arguments

1. Applicant's arguments filed on 3/18/2009 have been fully considered but they are not persuasive. Wilson teaches superabsorbent material which is made of polyester fabric, is swelled with a methanol water mixture [column 7, lines 23-41]. Therefore, it is flexible.

IDS submitted on 11/5/2008 and 3/18/2009 are considered and attached herewith.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 35 and 129 are rejected under 35 U.S.C. 102(b) as being anticipated by Hockaday et al (US 2001/0045364 A1).

4. Regarding claims 35 and 129, Hockaday discloses a rectangular shaped fuel cell system comprising a fuel cell (24, 20, 19, 17) having a hydrogen bubbling area (18) (variable volume chamber), a fuel tank (27) (cartridge or fuel generator) with wicking material (26), a membrane and wall (25). The wicking material within the fuel tank makes it a variable volume chamber. The fuel electrode (24) of the fuel cell elastically

Art Unit: 1795

moves up and down and creates a variable volume chamber. The membrane and filter wall (25) having small pores acts as a valve system which regulates and transfer fuel flow to the fuel cell. [Fig. 2; paragraph 0100-0102]. Hockaday also teaches that the cartridge or fuel generator can be a separate device to use with a fuel cell and automatically supply fuel to the fuel cell when connected together [Fig. 1; paragraph 0017, 0097-0099]. Hockaday further teaches that the fuel electrode (24) elastically (flexible material) moves [paragraph 0100] from an un-expanded position to an expanded position and makes a variable volume. The method of assembling the fuel cell and the cartridge is inherent.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 35 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams (US 2004/0151962 A1).

Regarding claims 35 and 129, Adams discloses a fuel cell comprising fuel cartridge (10) having variable volume, a fuel cell (MEA) having a mixing zone (62) (variable volume) [Fig. 9-11]. The materials for the insert (12) and mixing zone (62) are sponges and fibrous polymer [paragraph 0049, 0063] which are flexible and make cartridge and the fuel cell with variable volume. And when the cartridge and the fuel cell are connected, fuel is transferred to the fuel cell. Since the materials for the mixing zone is sponge, it will swell to an expanded position. The method of assembling the fuel cell and the cartridge is inherent. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to adopt the teachings of Adams for assembling a fuel cell in order to have an efficient system.

Art Unit: 1795

9. Claims 35-41, 43-44, 46-53 and 118-119, 122-132 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birschbach (US 2004/0146769 A1) in view of Wilson (US 6,808,838 B1).

Regarding claims 35 and 129, 132, Birschbach discloses a fuel cell assembly (31) including a membrane electrode assembly, an anode plate, a cathode plate, a removable fuel cartridge (39, 184), and a fuel delivery system (41). The fuel cartridge (39, 184) includes an expandable (variable) fuel bladder (chamber) for receiving liquid fuel (*cartridge 184 is disposable and non-refillable since it does not have any refilling port*). The fuel cell has a fuel chamber (60) fluidly connected to the fuel side of polymer electrolyte membrane [Fig. 2-3, 7, 13, 24-25; paragraph 0070, 0078. Birschbach teaches connecting cartridge with the fuel cell [paragraph 0090]. Birschbach also teaches transferring fuel from the cartridge to the fuel cell [paragraph 0086-0087, 0090]. Birschbach does not explicitly teach the steps as recited, however, it is within the technical reach of a skilled artisan to connect a cartridge to a fuel cell and transfer fuel to the fuel cell. Birschbach remains silent about variable volume of the chamber. However, Wilson discloses a fuel cell comprising an anode side cavity (34) filled with superabsorbent material (36) which makes it variable volume [Fig. 2B; column 6, lines 12-33]. Wilson further teaches superabsorbent material which is made of polyester fabric, is swelled with a methanol water mixture [column 7, lines 23-41] which is expanding from an initial un-expanded position. Therefore, it is flexible. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize an absorbing material in the fuel chamber as taught by Wilson in the

Art Unit: 1795

fuel cell of Birschbach in order to have flexible expandable and contractible chamber for efficient operation.

Regarding claims 36-40 and 50, Birschbach teaches fuel (fluid) transferring from the cartridge to the fuel cell and transferring of water and carbon dioxide (fluid) from the fuel cell to the cartridge. A fuel delivery system comprising valves is used for controlling fluid flow [Fig. 2-3, 19-23; paragraph 0010-0012, 0086-0087, 0090-0092, 0129, 0155-0156]

Regarding claims 41 and 43, Birschbach teaches that transferring comprises compressing the bladder of the cartridge to cause the fluid to enter into the fuel cell and also using a pump (149) to transfer fluid to the fuel cell [Fig. 11, 13, 17; paragraph 0085-0087, 0109-0111, 0121-0124].

Regarding claim 44, Wilson does not teach that the variable volume comprises flexible wall with folds, however, it is within the technical reach of a skilled artisan to shape it with flexible folded wall.

Regarding claim 46, Wilson teaches that the anode side cavity (34) is filled with superabsorbent material (36) [Fig. 2B; column 6, lines 12-33] which makes it flexible expandable when it absorbs fluid and contractible when it desorbs.

Regarding claim 47, Birschbach teaches that the cartridge uses an expandable bladder (86) [Fig. 7; paragraph 0086].

Regarding claims 48-49 and 51, Birschbach teaches that cartridge is coupled to a valve and the valve is opened when the fuel cartridge is inserted [paragraph 0091]. Birschbach remains silent about the male or female connection of the valve; however, it

Art Unit: 1795

is within the technical reach of a skilled artisan to connect a valve in male or female orientation.

Regarding claims 52-53, Birschbach does not explicitly teach the steps as recited, however, it is within the technical reach of a skilled artisan to disconnect a cartridge after fluid transfer is over and to connect a new cartridge to a fuel cell.

Regarding claims 118 and 119, Wilson teaches that the variable volume chamber is arranged and defined by the anode member and the flexible member [Fig. 2B].

Regarding claims 122-128 and 130-131, Birschbach teaches that the cartridge is inserted into the body of the fuel cell to function and the cartridge contains a expandable pressure member (87a, 87b, 87c, 87d) or compression plates (138, 139) which exerts pressure on the bladder and as soon as the cartridge inserted in the fuel cell fuel flows to the fuel cell automatically through the spring loaded valve (128) [Fig. 10-14; paragraph 0104-0113].

10. Claims 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Birschbach (US 2004/0146769 A1) in view of Wilson (US 6,808,838 B1) as applied in claim 35 and further in view of Adams et al (US 2005/0023236 A1).

Regarding claim 42, Birschbach/Wilson fails to teach that fluid comprises fuel and electrolyte. However, Adams discloses a fuel cartridge for a fuel cell where the fluid in the cartridge comprises fuel and electrolyte [paragraph 0047]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize fuel and electrolyte as taught by Adams in the fuel cell of

Art Unit: 1795

Birschbach/Wilson in order to have longer shelf life since the electrolyte does not dry out and extra electrolyte may improve the interface between the cathode and the anode.

11. Claims 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Birschbach (US 2004/0146769 A1) in view of Wilson (US 6,808,838 B1) as applied in claim 35 and further in view of Deinzer et al (US 2006/0172171 A1).

Regarding claim 45, Birschbach/Wilson remains silent about the wall construction of the cartridge. However, Deinzer discloses a fuel cell cartridge comprising flexible wall with folds made from elastomer [Fig. 3; paragraph 0067]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize teachings of folded wall as taught by Deinzer in the fuel cell of Birschbach/Wilson in order to have compact and easily compressible cartridge.

12. Claims 120-121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birschbach (US 2004/0146769 A1) in view of Wilson (US 6,808,838 B1) as applied in claim 35 and further in view of Ren et al (US 2004/0209136 A1).

Regarding claims 120-121, Birschbach/Wilson teaches that the variable volume chamber is arranged and defined by the anode member and the flexible member. Birschbach/Wilson does not teach that the flexible member has a peripheral portion attached to the anode frame member. However, Ren discloses a fuel cell system comprising a methanol cartridge connected to the fuel cell where fuel is delivered to through a delivery film (460) which is made of thin polymeric film (flexible member) and attached to the anode chamber [Fig. 4-6; paragraph 0068-0071]. Therefore, it would

Art Unit: 1795

have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize teachings attaching the flexible member as taught by Ren in the fuel cell of Birschbach/Wilson in order to have a secured and efficient fuel cell.

13. Claims 133-135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birschbach (US 2004/0146769 A1) in view of Wilson (US 6,808,838 B1).

Regarding claims 133-135, Birschbach discloses a fuel cell assembly (31) including a membrane electrode assembly, an anode plate, a cathode plate, a removable fuel cartridge (39, 184), and a fuel delivery system (41). The fuel cartridge (39, 184) includes an expandable (variable) fuel bladder (chamber) for receiving liquid fuel. The fuel cell has a fuel chamber (60) fluidly connected to the fuel side of polymer electrolyte membrane [Fig. 2-3, 7, 13, 24-25; paragraph 0070, 0078]. Birschbach teaches connecting cartridge with the fuel cell [paragraph 0090]. Birschbach also teaches transferring fuel from the cartridge to the fuel cell [paragraph 0086-0087, 0090]. Birschbach does not explicitly teach the steps as recited, however, it is within the technical reach of a skilled artisan to connect a cartridge to a fuel cell and transfer fuel to the fuel cell. Birschbach remains silent about variable volume of fuel cell chamber. However, Wilson discloses a fuel cell comprising an anode side cavity (34) filled with superabsorbent material (36) which makes it variable volume [Fig. 2B; column 6, lines 12-33]. Wilson further teaches superabsorbent material which is made of polyester fabric, is swelled with a methanol water mixture [column 7, lines 23-41] which is expanding from an initial un-expanded position, therefore, it is flexible. . Birschbach

Art Unit: 1795

further teaches that the cartridge is inserted into the body of the fuel cell to function and the cartridge contains a expandable pressure member (87a, 87b, 87c, 87d) or compression plates (138, 139) which exerts pressure on the bladder and as soon as the cartridge inserted in the fuel cell fuel flows to the fuel cell automatically through the spring loaded valve (128) [Fig. 10-14; paragraph 0104-0113]. Likewise, when the fuel enters into the superabsorbent material of the fuel cell it will increase in volume.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize an absorbing material in the fuel chamber as taught by Wilson in the fuel cell of Birschbach in order to have flexible expandable and contractible chamber for efficient operation.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1795

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUHAMMAD SIDDIQUEE whose telephone number is (571) 270-3719. The examiner can normally be reached on Monday-Thursday, 7:30 am to 4:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Muhammad Siddiquee/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Application/Control Number: 10/824,443
Art Unit: 1795

Page 12